Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously presented) An image processing system for displaying information relating to the amplitude of displacements of wall regions of a deformable 3D object under study, the system comprising:

acquisition means for acquiring image data of an image sequence of the 3D object under study;

processing means for:

processing the 3D object data in the images of the sequence for locating the 3D object wall, defining regions of interest on the 3D object wall, and processing the image data of the 3D object wall to determine the amplitude of displacement of each of said regions of interest as a function of time; and

constructing a first 2D simplified representation of the 3D object wall by projection of the 3D object wall along an axis, comprising the projections of the regions of interest in said 2D simplified representation; and

display means for displaying indications of the amplitudes of displacement of each of the regions of interest of the 3D object wall in the respective projections of said regions of interest, called segments, in said constructed 2D simplified representation.

2. (Previously presented) The image processing system of claim 1, wherein the means for constructing this first 2D simplified representation, called 2D simplified amplitude representation, provides indications of amplitudes that are indications of the maximal or minimal amplitudes of displacements of the regions of interest over a period of time.

3. (Previously presented) The image processing system of claim 2, further comprising means for:

constructing a second 2D simplified representation of the 3D object wall, similar to the first 2D simplified representation of the 3D object wall, and with similar projections of the regions of interest, called segments, this second 2D simplified representation being called 2D simplified phase representation; and

displaying indications of the instants of time at which the maximum or minimum of amplitudes of displacements occur in the regions of interest, over said period of time, in said 2D simplified phase representation.

4. (Original) The image processing system of claim 3, comprising means to display the 2D simplified amplitude representation and the 2D simplified phase representation together in a same image.

5. (Previously presented) The image processing system of claim 4, comprising means to display the values of amplitude and of time in the respective 2D simplified amplitude representation and the 2D simplified phase representation indicated in a color-coded manner.

6. (Previously presented) The system of claim 1, comprising means to display indications of the amplitudes of displacement of the regions of interest of the 3D object wall in the respective projections of the regions of interest, called segments, in said constructed 2D simplified representation, in a color-coded manner, the indications of the amplitudes of displacement changing in the segments at the rate of the images of the sequence, so as to form an animated 2D simplified representation as a function of time.

7. (Currently amended) The image processing system ~~of one~~ of claim~~s~~ 1 ~~to 6~~, comprising means to display the 2D simplified representations of the 3-D object wall as 2D bull's eye representations.

8. (Previously presented) The image processing system of claim 1, wherein the object under study is the heart left ventricle and the regions of interest include the internal boundary of the left ventricle wall.

9. (Previously presented) The image processing system of claim 1, wherein the processing means for locating the 3D object wall is a segmentation means for operating a segmentation technique applied to the 3D object under study, which includes using a mesh model technique, and reshaping the mesh model for mapping said mesh model onto the wall of the 3D object under study, so as to provide a simplified volume with a wall, called object wall, that is the object of interest.

10. (Previously presented) A system comprising a suitably programmed computer or a special purpose processor having circuit means, which are arranged to process image data as claimed in claim 1, and having means to display the processed images.

11. (Currently amended) An image processing method for processing ultrasound image data and for displaying an ultrasound image of a deformable 3-D organ with indications of the organ wall motions, wherein the method is performed by an image processing system, comprising steps of:

acquiring image data of an image sequence of the organ under study, segmenting the 3-D organ in the images of the sequence for locating the 3D object wall, defining regions of interest on the segmented 3D organ wall, and processing the image data to determine the amplitude of displacement of each of said regions of interest as a function of time;

constructing a first 2D simplified representation of the 3D segmented organ wall by projection of the 3D segmented organ wall along an axis, comprising the projections of the regions of interest in said 2D simplified representation; and

displaying indications of the amplitudes of displacement of the regions of interest of the 3D segmented organ wall in the respective projections of the regions of interest, called segments, in said constructed 2D simplified representation, in a color coded manner.

12. (Previously presented) The method of claim 11, comprising steps of:

displaying indications of the maximal or minimal amplitudes of displacement of each of the regions of interest, over a period of time, this first 2D simplified representation being called 2D simplified amplitude representation;

constructing a second 2D simplified representation of the 3D segmented organ wall, similar to the first 2D simplified representation of the 3D segmented organ wall, and with similar projections of the regions of interest, called segments, this second 2D simplified representation being called 2D simplified phase representation; displaying indications of the instants of time at which the maximum or minimum of amplitudes of displacements occur in the regions of interest, over a period of time, in said 2D simplified phase representation; and

displaying the 2D simplified amplitude representation and the 2D simplified phase representation in a same image at the same time.

13. (Cancelled)

14. (Previously presented) The method of claim 11, wherein displaying indications of the amplitudes of displacement of the regions of interest comprises displaying values of the amplitudes in a color-coded manner.

15. (Previously presented) The method of claim 12, wherein displaying indications of the amplitudes of displacement of the regions of interest, and displaying the indications of the instants of time at which the maximum or minimum of amplitudes of displacements occur in the regions of interest in the respective 2D simplified amplitude representation and the 2D simplified phase representation comprises displaying values of the amplitudes and of the instants in time in a color-coded manner.

16. (New) A computer-readable storage medium, comprising computer executable instructions for processing ultrasound image data and for displaying an ultrasound image of a deformable 3D organ with indications of the organ wall motions, the computer executable instructions causing an image processing device to:

acquire image data of an image sequence of the organ under study;

segment the 3D organ in the images of the sequence for locating the 3D object wall;

define regions of interest on the segmented 3D organ wall; and

process the image data to determine the amplitude of displacement of each of said regions of interest as a function of time.

17. (New) The computer readable storage medium of claim 16, further comprising computer executable instructions which cause the image processing device to:

construct a first 2D simplified representation of the 3D segmented organ wall by projection of the 3D segmented organ wall along an axis, wherein projections of the regions of interest are part of the 2D simplified representation; and

display indications of the amplitudes of displacement of the regions of interest of the 3D segmented organ wall in segments within the constructed 2D simplified representation, wherein the indications are color-coded.

18. (New) The computer readable storage medium of claim 16, further comprising computer executable instructions which cause the image processing device to:

display indications of the maximal or minimal amplitudes of displacement of each of the regions of interest, over a period of time.

19. (New) The computer readable storage medium of claim 16, further comprising computer executable instructions which cause the image processing device to:

construct a second 2D simplified representation of the 3D segmented organ wall, similar to the first 2D simplified representation of the 3D segmented organ wall, this second 2D simplified representation being called 2D simplified phase representation.

20. (New) The computer readable storage medium of claim 16, further comprising computer executable instructions which cause the image processing device to:

display indications of the instants of time at which the maximum or minimum of amplitudes of displacements occur in the regions of interest, over a period of time, in said 2D simplified phase representation.

21. (New) The computer readable storage medium of claim 16, further comprising computer executable instructions which cause the image processing device to:

display the 2D simplified amplitude representation and the 2D simplified phase representation in a same image at the same time.